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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/521,590

01/18/2005

Mitsunori Toyoda

122397

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02/15/2007

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EXAMINER

NGUYEN, HUNG

ART UNIT

PAPER NUMBER

2851

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/15/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/521,590

Applicant(s)

TOYODA, MITSUNORI

Examiner

Hung Henry V. Nguyen

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11/30/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-25 and 39-52 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13, 15, 18-19, 24-25, 39-42, 46-48, 52 is/are rejected.
- 7) ☒ Claim(s) 14, 16, 17, 20-23, 43-45 and 49-51 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 11/30/06.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

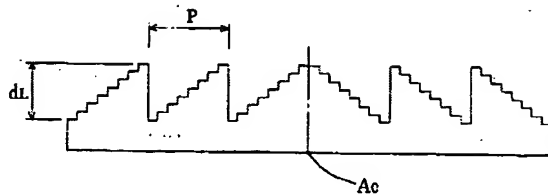
1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 13, 40, and 47 are rejected under 35 U.S.C. 102(e) as being anticipated by Goto (US 2003/0227684 A1).

As to claims 13, 15, 40 and 46-47, Goto discloses an illumination optical system (see figure 1) for illuminating an irradiated plane (M) with light from a light source (1) supplying pulse laser light, a diffractive optical element (4) for transforming an input pulse laser beam and a corresponding method, comprising all of the structures set forth in the instant claims such as: a diffractive optical element (4) arranged in an optical path between the light source and the irradiated plane, an optical material forming the diffractive optical element includes an oxide crystal material (see section [0157], lines 16-18) and the diffractive optical element has a surface shape (blaze type ring shaped surface, or multi level type ring shaped surface, or binary type ring shaped surface) (see figures 22 a, b, c) formed on the oxide crystal material and wherein the oxide crystal material is one of quartz crystal, barium titanate, titanium trioxide, magnesium oxide and sapphire.



With respect to claim 18, Goto teaches the diffractive optical element (4/6) transforming an incident light beam into a light beam having a given light intensity distribution (see section [0069]).

As to claim 19, Goto discloses an optical integrator (8) for forming a secondary light source in a given shape on an illumination pupil plane in accordance with a light beam passing through the diffractive optical element.

With respect to the intervening effecting filing date of Goto, applicant's intention is directed to the procedure set forth in MPEP section 201.15.

3. Claims 13-15, 18, 24-25, 40-42, 46-48 and 52 are rejected under 35 U.S.C. 102(e) as being anticipated by Kato et al (US 2002/0030890A1).

With respect to claims 13-15, 18 and 24-25, 40-42, 46-48 and 52, Kato et al discloses an illumination optical system, a diffractive optical element and corresponding method (see figure 12) for illuminating an irradiated plane with light from a light source (11) supplying pulse laser light (see section [0046]) and comprising all of the limitations of the instant claims such as: a diffractive optical element (12) arranged in an optical path between the light source and the irradiated plane (R) and an optical material forming the diffractive optical element includes an oxide crystal material such as quartz crystal ( $\text{SiO}_2$ ) or sapphire (see section [0038]; [0060]). Kato et al teaches that the diffractive optical element has a surface shape formed on the oxide

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crystal material (see figure 4) by dry etching (see section[0061]) and the diffractive optical element transforms an incident light beam into a light beam having a given light intensity distribution. Kato et al further teaches a projection optical system (13) for projecting and exposing a patterned of a mask (R) arranged on the irradiated plane on a photosensitive substrate (W). Kato teaches the diffractive optical element being adapted for use with light of a wavelength 248 nm from a KrF excimer laser (see section [0046]).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al (US 2002/0030890 A1 in view of Komatsuda et al (U.S.Pat. 6,563,567).

As to claim 19, Kato discloses an illumination optical system and method having substantially all of the structures set forth in the instant claim as discussed, except for an optical integrator for forming a secondary light source in a given shape on an illumination pupil plane based on a light beam through the diffractive optical element. Komatsuda et al discloses an illumination optical system having a diffractive optical element (6) and an optical integrator (8) for forming a secondary light source in a given shape on an illumination pupil plane based on a light beam through the diffractive optical element (see figure 1). It would have been obvious to combine the teachings of Kato and Komatsuda to obtain the invention as specified in the claim

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19 of the present invention. It would have been obvious to a skilled artisan to employ an integrator as suggested by Komatsuda into the illumination of Kato for generating a desired intensity distribution thereby improving the resolution of the printed images.

6. Claims 14 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (U.S.2002/0030890 A1) in view of Hiraiwa (U.S.Pat. (U.S.Pat. 5,699,183).

With respect to claims 14 and 39, Kato discloses substantially all of the limitations of the instant claims as recited, Kato does not expressly disclose that the light beam having an energy density of  $1\text{mJ}/\text{cm}^2/\text{pulse}$  or  $10\text{mJ}/\text{cm}^2/\text{pulse}$  or more passes the diffractive optical element. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Furthermore, Hiraiwa et al discloses an illumination optical device for illuminating an irradiated plane having an optical element arranged in an optical path between the light source and the irradiated plane through which a light beam from a KrF excimer laser having an energy density of  $400\text{mJ}/\text{cm}^2/\text{pulse}$  passes (see col.10, lines 15-18). In view of such teachings, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Kato et al and Hiraiwa to obtain the invention as specified in the instant claims. As suggested by Hiraiwa, it would have been obvious to a skilled artisan to design the diffractive optical element of Kato in such a way that the light beam having an energy density of  $1\text{mJ}/\text{cm}^2/\text{pulse}$  or  $10\text{mJ}/\text{cm}^2/\text{pulse}$  or more can pass. The purpose of doing so would have been to improve the durability required of an optical for use in the UV lithography and to improve the quality of the images to be printed.

***Allowable Subject Matter***

7. Claims 14, 16-17, 20-23, 43-45 and 49-51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record either alone or in combination, neither discloses nor makes obvious the combination of an illumination optical system, a diffractive optical element and corresponding method comprising among other features, a diffractive optical element has a surface shape formed on the oxide crystal material wherein an optic axis of the oxide crystal material is specifically set as recited in the instant claims of the present invention.

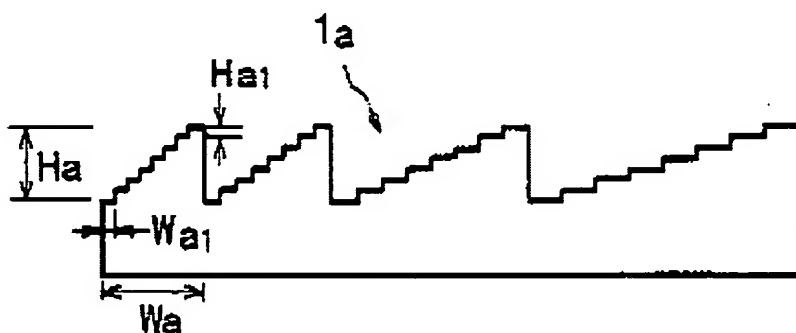
***Response to Amendment/Argument***

9. Applicant's amendment filed November 30, 2006 has been entered. Claims 13, 14, 17, 21 have been amended. Claims 26-38 have been cancelled. New claims 39-52 have been added. Regarding claims 13, 15, 18-19, 24-25, 39-42, 46-48 and 52; applicant's arguments in conjunction with the amendment have been carefully reviewed but they have not been found persuasive. The applicant is reminded that the claimed subject matter to examination will be given their broadest reasonable interpretation consistent with the specification, and limitations appearing in the specification are not be read into the claims. In re Yamamoto, 740 F. 2d 1569, 1571, 222 USPO 934, 936 (Fed.Cir. 1984).

With this in mind, the discussion herein will focus on how the terms and relationships thereof in the claims are met by the references. Response to any limitation that is not in the

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claims or any argument that is irrelevant to or does not relate to any specific claimed language will not be warranted. In response to applicant's argument that Kato et al discloses forming the surface shape of a diffractive optical element on an amorphous material, not on an oxide crystal material. The Examiner regrettably disagrees with the applicant since this is not quite true. Kato meets the limitation as claimed because Kato clearly discloses that (see figure 2A) the diffraction optical element (1) having diffraction grating (1a) made of quartz or silica ( $\text{SiO}_2$ ) (see section [0038]). It is clearly disclosed in figure 2A of Kato that the surface shape (sawtooth shaped) formed on the oxide crystal material (1a). Therefore, the rejections of claims 13, 15, 18-19, 24-25, 39-42, 46-48 and 52 are maintained as set forth above.



With respect to the limitations of claims 14, 16-17, 20-23, 43-45 and 49-51, applicant's arguments are persuasive and the rejection of these claims have been withdrawn.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Henry V. Nguyen whose telephone number is 571-272-2124. The examiner can normally be reached on Monday-Friday (First Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on 571-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**Hung Henry V Nguyen**  
**Primary Examiner**  
**Art Unit 2851**

hvn  
2/9/07